

Candidate's Name: .....Signature: .....

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PHYSICS

Paper 1

2024

2½ hours



# B.PETER'S ACADEMIC PLATFORM

UGANDA LOWER SECONDARY CERTIFICATE OF EDUCATION

ASSESSMENTS TO CANDIDATES

PHYSICS PAPER 1

THEORY SENIOR

FOUR

## INSTRUCTIONS TO CANDIDATES:

This paper consists of several examination items.

Answer all items for your good academic performance all.

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'Yesterdays failures are today's seeds that must be diligently planted to be able to abundantly harvest tomorrows success'

## Item 1

In a certain town, it is a must for drivers to be tested with their vehicles for road-worthiness. On a certain day, a car started from rest and accelerated to  $50 \text{ ms}^{-1}$  in **10 seconds**. The driver maintained that velocity for **20 seconds** and suddenly decelerated to rest in **2 seconds** causing him to crash into windscreen. As a result, the car tyres wore out on the tarmac causing a lot of heat on the ground.

### Support material



### Task

You have been tasked to write a report to explain the scene. In your report include a motion graph, find the rate at which the car's velocity reduces and explain, with reasons, why driver crashed into the wind screen. Advise by stating whether the driver's average speed exceeded the speed limit of  $8 \text{ ms}^{-1}$  and how he would prevent the crushing. (20 scores)

## Item 2

Challenges arise in a community of an isolated district in Uganda. Mixed beliefs, anxiety, mistrust and poverty have cropped up. Rainbows happening to some places when it rains and illusionary water pools on sunny days on road surfaces have been attributed to area clergy and witch-doctors. Furthermore, there is change in color where different objects when placed in the night security lights of one of the residents, who is believed to have miraculous powers of God. A lot of money is being spent by residents to get miracles to avoid misfortunes and evil spirits from spiritual people.

Prepare a speech you would give in the upcoming community gathering to address this challenge. (20 scores)

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### Item 3

Of recent, a storied building being constructed in Kampala near Munyonyo collapsed and took very many lives. However, when police arrested the contractor and asked the cause of the collapse, he complained that the client did not give enough money to buy the appropriate materials for constructing the building given that the place is affected much by harsh weather conditions. However, when the **KCCA** Engineer was tasked to analyze the situation, he said “the mechanical properties of the materials being used are below the standard required for a storied building near such areas. He said Young’s modulus of steel should be about  $2.0 \times 10^{11} \text{ Nm}^{-2}$ ”. This statement confused the public the more.

### Support material



A force of **500 N** causes an extension of **20 mm** on an iron bar of length **100 cm** whose cross-sectional area is  **$0.05 \text{ cm}^2$** .

### Task

As a learner of Physics, you have been asked by police to produce a report about the scene to help the police carry out investigation on the contractor. (20 scores)

### Item 4

There has been an outbreak of malaria in your community and your friend is admitted in hospital. You have been delivering a warm meal; however, you are required to deliver a hot meal for her in the hospital.

#### TASK

Without using a food flask, how would you ensure that the food you have prepared remains hot until you reach the hospital? (20 scores)

### Item 5

**‘Yesterdays failures are today’s seeds that must be diligently planted to be able to abundantly harvest tomorrows success’**

On evening, Catherine kept juice in a tightly filled and corked glass bottle in a deep freezer. On opening the freezer, the following morning, she found the glass bottle broken with the juice frozen. As a Physics learner, explain to her what happened and advise her on what to do next time.  
(20 scores)

### Item 6

A boy was travelling with her parents by means of water transport. He carried a ball and a phone taking selfies along the journey. On their way, water waves disturbed the boat and all he had on his hands dropped in water. However, with much disappointment of losing his phone, allover sudden, he realized the ball was still on top of water though his phone was nowhere to be seen. This scene left them wondering the magic with the ball. As they continued, they looked in the air and saw two people seated in a bucket connected to a balloon with burning flame was carrying them in space. The boy was confused and wondered how the two men would land safely on the ground though his parents could not explain anything to him.

Support information



Take the density of water =  $1000 \text{ kg m}^{-3}$

- Acceleration due to gravity =  $10 \text{ ms}^{-2}$
- Mass of the boat = 200 kg
- Mass of a phone = 500 g
- Volume of a phone =  $50 \text{ cm}^3$
- Volume of a ball =  $20 \text{ cm}^3$
- Volume of the boat =  $3000 \text{ cm}^3$

Task

**'Yesterdays failures are today's seeds that must be diligently planted to be able to abundantly harvest tomorrows success'**

As a Physics learner, help the boy understand what happened while on the boat and explain for him how the two heavy men were carried by just a balloon with burning air.

(20 scores)

### Item 7

The rampant rains in the country have caused destruction of lives and property. The citizens have been advised to relocate to the nearby camp gazetted by the government. However, they do not have enough food. The World Food Programme (WFP) has supplied bags of maize flour packed in **50 kg** sacks, but wishes to give the flour in different ratios. That is,

- Families with more than **10** members: **25 kg**.
- Between **7-9** members: **20 kg**
- Between **4-6** members: **15 kg**
- Below **4** members: **10 kg**
- All district leaders to take **50 kg** each

Unfortunately, they did not carry the weighing machine, but there is a nearby carpentry with a uniform piece of wood of mass **30 kg** and length **4 m**.

Task

Write a report to the store man explaining how he can measure the different masses using the piece of wood (20 scores)

### Item 8

The school welfare department is facing a challenge of rain affecting their catering activities due to lack of a kitchen. The school is planning to construct a modern kitchen, which can save energy and reduce on the temperature inside.

### Task

You are appointed as the head of construction committee for this kitchen, conduct a survey and compile a report you will present to the school welfare department showing the kind of cooking utensils required, how to paint the walls to reduce heat inside and outside the kitchen and how to manage air exchange inside the kitchen. (20 scores)

### Item 9

At a construction site, Mbwali Milly was tasked to carry bricks from where they were to the

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masons. The task was tiresome. She applied a lot of energy and would carry a few bricks a day. She asked the foreman for a wheelbarrow. Soon, she had to take the bricks up the building. This time, she asked for a plank of wood which she used to make an inclined plane. But she would be tired by noon! So, the foreman suggested that she makes a single machine that would move the bricks up vertically.

When the foreman looked in the vicinity, he realised that there was a motorcycle wheel, long ropes, straight poles, tall enough to reach the position where the bricks were to be put, and a large hemispherical pan.

### Tasks

(a) Make a brief explanation why and how each machine was able to simplify work. **(08 scores)**

(b) Show how Milly could assemble the items to come up with a simple machine and how she would use it to lift the building materials up to the floor in the shortest time possible.

### Item

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During preparation for the function or party at your school, two decorators disagreed on the right position to hang the balloons. One preferred the balloons to be placed in direct sunshine. However, the other insisted that they should be inside the tent.

### Task

As a Physics Learner, write an advisory message, with reasons, indicating the place where the balloons should be placed. **(20 scores)**

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WORLD THROUGH EDUCATION"

